

REMARKS

Claims 1 and 2 are in the application as filed. New Claims 3 through 38 have been added. Claim 2 is deleted. Claims 1 and 20 are now the independent claims; amended claim 1 includes the limitation "and wherein the substrate is glass", and new claim 20 includes the limitation "and wherein the surface of the substrate is treated". It is believed that these limitations distinguish the invention over the cited art.

REJECTIONS UNDER 35 USC 103(a)

Claim 1 is rejected as obvious over JP-11-260664 in view of Loria et al. 5,443,628.

JP11-260664 teaches a device for improving the accuracy of printing and discloses a method of making a multilayer chip component comprising: ink jet printing internal electrodes on green sheets; laminating the green sheets; and firing them.

Loria et al. has a Claim 1 that reads: "An ink composition suitable for ink jet printing operations, comprising a dispersion of synthetic pigment particles that have a particle size from about 0.02 to about 0.20 microns, with at least about 90 percent of said particles having diameters less than about 0.1 micron, a carrier and a binder." Loria et al. discloses dispersing pigments in inks. Loria et al disclose a selection of binders but do not specifically select polyvinylpyrrolidone or its copolymers as a binder. Pigments are generally metal oxides and are usually lighter than metals. The printed pigments must be dried up to about 500 degrees F. The present application fires to 580 degrees C.

Applicant have amended the claims to indicate that the substrate is glass in Claim 1 and also written Claim 20 to include a limitation that the substrate is treated.

Applicant respectfully points out that dispersing metal powders, as is required in the instant application, particularly heavy metals like silver, is more difficult than dispersing oxides.

Claim 1 is further rejected as obvious over JP 2000-182889 in view of either '628 (Loria et al.) or Zhu 5,889,083.

JP 2000-182889 describes a process for raising the productivity of an electronic component by peeling off a base film from a ceramic green sheet fixed to a base film and forming an ink pattern on the surface of the green sheet from which the base is peeled off. The solution is a method for manufacturing a laminate ceramic electronic component by forming ceramic green sheet fixed to a base film, peeling off the base film from the green sheet to expose a base film surface, forming an ink pattern on the base film then laminating a desired number of green sheets and pressing them to form a ceramic green laminate which can then be cut into shape to make an electrode.

Loria describes an ink jettable composition but has not selected polyvinylpyrrolidone or its copolymers as a binder.

Zhu teaches a selection of binders, including polyvinylpyrrolidone, but does not select polyvinylpyrrolidone as a preferred binder. Zhu uses pigments or colorants that are carbon or metal oxides. No post heating step is mentioned and no mention is made of resinate compounds or UV-curable monomers and photoinitiators.

Claims 1 and 2 are both rejected as obvious over EP-0 989570 in view of either '628 or '083. Claim 2 is now cancelled.

EP-0 989570 teaches an ink for electronic component comprising water or organic solvent and a resin in such water or solvent and teaches a method for manufacturing an electronic component comprising the steps of repeating a plurality of times a process for forming a specified ink pattern on a green ceramic sheet via an ink jet method using an ink prepared by dispersing metal powder with a particle size of 0.001 -10 um. However, EP-0 989570 does not specifically teach polyvinylpyrrolidone as a binder. It had no post heating and uses no resinate compounds.

Loria et al. has been discussed above.

The Zhu, Patent '083 has a claim that reads "A jet ink composition suitable for jet printing on paper, glass, metal, or plastic surfaces messages having scratch resistance and rub resistance comprising water, a colorant, a binder resin, and a polytetrafluoroethylene wax." Zhu teaches a selection of binders, including polyvinylpyrrolidone, but does not select out polyvinylpyrrolidone as a preferred binder as in done in the instant application.

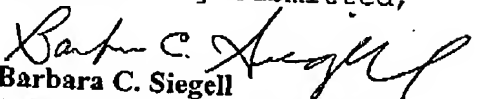
The present invention uses polyvinylpyrrolidone containing homopolymer or polyvinylpyrrolidone containing copolymers in the formation of ink composition that may be applied by various technologies and remains stable for about 24 hours, and may be restabilized, if required, by shaking. Applicant maintains that the present invention can be looked at a selection invention. Applicant has specifically identified the polyvinylpyrrolidone species as a binder that is a most effective organic polymer for dispersing functional materials, especially metals and is

particularly effective for silver that is used in many electronic products.

In view of the amendments made above and the discussion above, allowance of claims 1 and new claims 3-38 is respectfully requested.

If anything else is needed to advance prosecution of this application, the Examiner is requested to contact applicant's attorney at the telephone number below.

Respectfully Submitted,


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